



**Mutual recognition of S&MA Standards  
Software Assurance  
Task Force Report  
NASA/ESA/JAXA trilateral meeting  
September 1, 2011**

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# Task Force Team Members

- **Agency Points of Contact:**

ESA: Rafael Prades

JAXA: Masafumi Katahira

NASA: John W. Lyver, IV

- **Software Assurance Subject Matter Experts:**

ESA: Rafael Prades, Lothar Winzer, Jérôme Dumas

JAXA: Masafumi Katahira, Tatsuya Kaneko,  
Tetsuya Nakano, Masami Mitsui

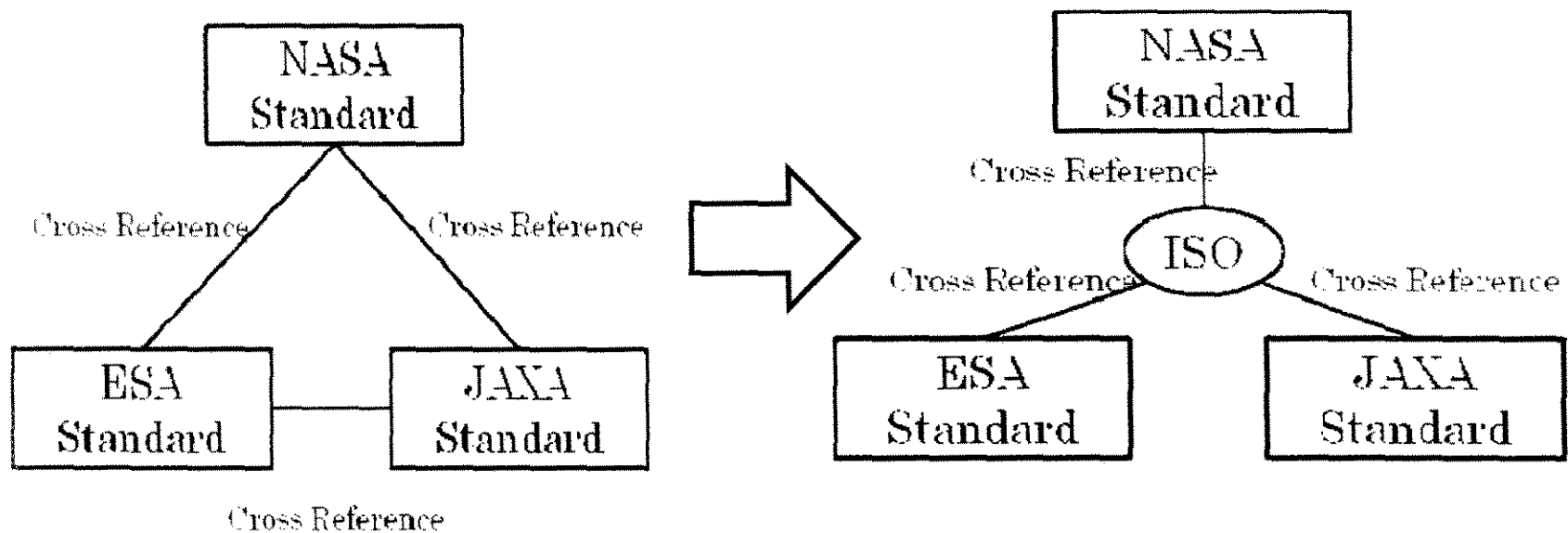
NASA: Martha Wetherholt, Melissa J. Bodeau, Kathy Malnick

# Purpose of the Task Force

- Interest in a cooperative activity among JAXA, ESA, NASA was expressed at 2009 Trilateral meeting  
***“Mutual recognition of S&MA standards”***
- Purposes:
  - To improve mutual understanding of each Agency's Standards and technical commonalities/differences
  - To create a reference
  - To discuss future usage of those task force products

# Cross-reference of software standards

## Approach



- ISO12207-1995 was selected because ISO 12207 is commonly used internationally
  - ISO12207-1995 contains 29 processes
  - All Agencies' Standards total over 550 requirements

## **Work to Date**

team communicated via monthly telecon/webex sessions and email

- Each Agency mapped their Standards/requirements to the chosen “reference” of ISO 12207-1995
- Each Agency reviewed the mappings done by the other Agencies and provided questions/comments/clarification
- Each Agency worked to describe how completely the Agencies’ requirements met each ISO requirement

# Documents Used by Task Force

- International Core Standard:

*ISO 12207-1995, Information technology – Software life cycle processes*

- ESA Documents:

*ECSS-E-40C: Space Engineering Software Standard*

*ECSS-Q-40C: Space Product Assurance Software Product Assurance*

- JAXA Document:

*JERG-2-600: Software Development Standard*

- NASA Documents:

*NPR 7150.2A: NASA Software Engineering Requirements*

*NASA-STD-8739.8: Software Assurance Standard*

*NASA-STD-8719.13: Software Safety Standard*

# Lessons Learned

- **Analysis Process & Result**
  - Software Assurance was a good choice and is relevant to all 3 Agencies.
  - Choosing a 'neutral' standard to use as the basis for comparison of each Agency's document set to was a good method. It provided a common reference point and put the 3 Agencies on equal footing.
  - Comparison codes were effective for discussion and to quantify results.
  - The analysis has been time-consuming and labor-intensive, but has produced a useful product and improved communication and understanding.

# Results

- No major disconnects were identified.
- Analysis of ISO-12207 Section 6.4, Verification, was done by all 3 Agencies
- Analysis of ISO-12207 Section 6.5, Validation, was done only by NASA
  - For the following two slides, the charts and data underlying the charts is based on NASA's preliminary analysis of information from the above.
  - A requirement “matches” the ISO requirement if the text, intent and/or information provided by the Agency is deemed to satisfy the ISO requirement, including by identical wording or equivalence.
  - A requirement is also considered matched when a combination of multiple Agency requirements can be used to satisfy one ISO requirement.

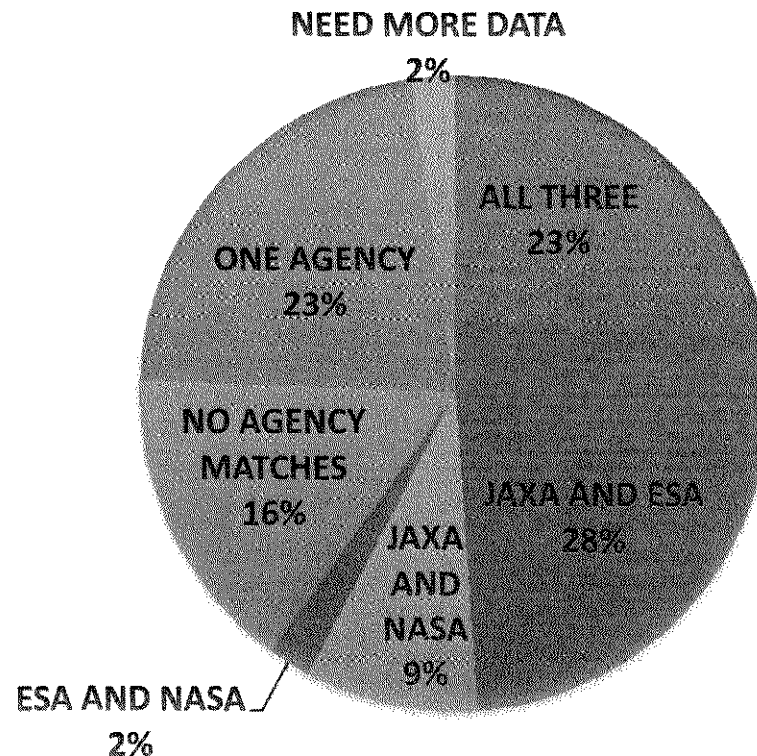


# Results

## 6.4 Verification (results shown based on NASA's preliminary analysis)

Mapping the requirements between Agency documents and ISO 12207-1995 Section 6.4 showed:

- 23% of the ISO requirements - all 3 Agencies match,
- 39% of ISO requirements - 2 out of 3 Agencies match,
- 23% of ISO requirements – Only 1 Agency matched
- 16% of the ISO requirements – No Agency matched the requirement.

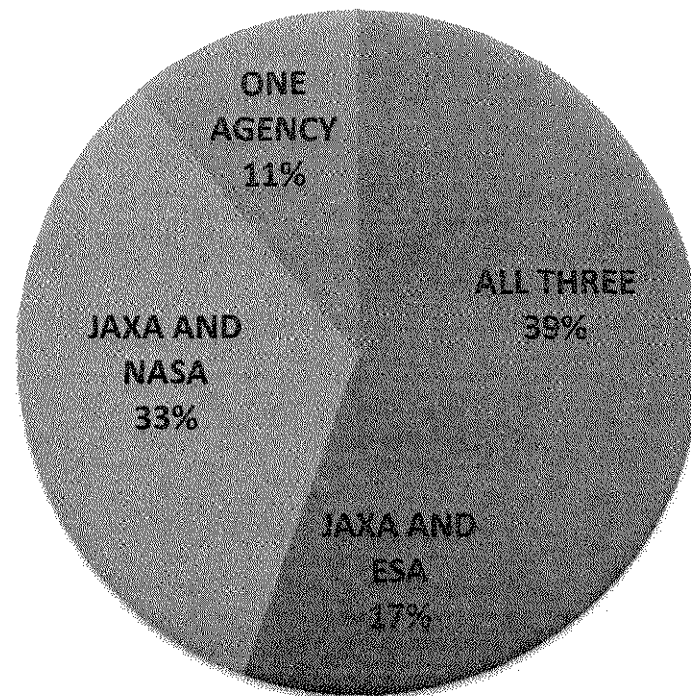


# Results

## 6.5 Validation (results shown based on NASA's preliminary analysis)

Mapping the requirements between Agency documents and ISO 12207-1995 Section 6.5 showed:

- All ISO requirements were matched by at least one Agency.
- 39% of the ISO requirements - all 3 Agencies match,
- 50% of ISO requirements - 2 out of 3 Agencies match,
- 11% of ISO requirements – Only 1 Agency matched



# Task Force Observations

## Task Force Purposes:

- *To improve mutual understanding of each Agency's Standards and technical commonalities/differences*
  - Observation #1: The analysis performed has been useful in improving awareness and understanding among the task force members and their Agencies.
  - Observation #2: Educational presentations by task force members have increased shared understanding of how the Agencies view and implement verification and validation activities.
- *To create a reference*
  - Observation #3: The analysis performed has resulted in a matrix which could (once final review is completed) be used as an informal reference when working on joint projects.
- *To discuss future usage of those task force products*
  - Observation #4: During the analysis, review and communication activities, each Agency has noted possible opportunities for improvement in their own documentation through comparison with the documentation of the other Agencies.

# Conclusion

- At the level of Agency requirements, it appears to be infeasible to perform an analysis with sufficient detail and confidence to enable the potential reduction of “redundant” activities.

This conclusion is based on a number of factors, including:

- The limited insight available at the requirement level
- The fact that similarity or commonality of requirements does not automatically imply overlapping or redundant **tasks/activities** (tasks are at a lower level than requirements)

## HOWEVER:

- The matrix generated by the Task Force Team’s analysis could be used at a project level to identify areas for further detailed technical discussion and information sharing.
- Such discussions could enable mutual agreements on specific projects and improve our individual and joint efforts in the future.

# Task Force Recommendation

- Each Agency should internally review and agree to a final version of the mapping matrix, which can then be informally distributed or made available to our internal Software Assurance communities.
  - Appropriate caveats need to accompany the matrix when distributed, for example:
    - For use within (Agency name) only, not for distribution
    - Reference/information document only, not policy or guidance
    - Based on specific versions of the Agency's and ISO standards, check that those versions are still in use
    - If any questions arise, contact the appropriate Agency Task Force Team POC.
- Each Agency will keep the others informed of future updates to the Agency documents used in this mapping effort.

# Thank You

On behalf of the members of the Software Assurance Task Force members, **Thank you** for supporting our efforts. We all feel that we have come a long way towards understand each others requirements and that our Agencies can better work together.